



REFERENCE SHEET

REFERENCE MATERIAL

IAEA-367

RADIONUCLIDES IN PACIFIC OCEAN SEDIMENT

Date of issue: January 2000[⊕]

Recommended Values (Based on dry weight)

Reference Date for decay correction: 1st January 1990

Radionuclide	Recommended Value Bq/kg	95% Confidence Interval Bq/kg	N*
⁶⁰ Co	1.0	0.9 – 1.3	18
⁹⁰ Sr	102	62 – 129	11
¹³⁷ Cs	195	190 – 201	68
²³⁹⁺²⁴⁰ Pu	38	34.4 – 39.8	30

Information Values (Based on dry weight)

Radionuclide	Information Value Bq/kg	95% Confidence Interval Bq/kg	N*
⁴⁰ K	5.2	2.0 – 8.0	7
¹⁵⁵ Eu	1.6	{0.9 – 2.2}	4
²²⁶ Ra	10.7	0.7 – 24.0	11
²²⁸ Th	0.2	{0.0 – 3.6}	4
²³⁰ Th	19	{5.5 – 26.0}	3
²³⁴ U	24	{12.8 – 44.0}	3
²³⁵ U	1.6	{0.9 – 2.8}	4
²³⁸ U	20.3	10.9 – 37.0	8
²³⁸ Pu	0.08	0.02 – 0.26	8
²⁴¹ Pu	170	{154 – 190}	4
²⁴¹ Am	26.4	24.0 – 27.7	40

* Number of accepted laboratory means which were used to calculate the recommended or information values and corresponding confidence intervals about the median values.

{ } Denotes the range of accepted results for the radionuclide in the intercomparison run.

⊕ Revision of the reference sheet dated September 1991

The values listed above were established on the basis of statistically valid results submitted by laboratories which had participated in an international intercomparison exercise organized during 1989-90. The details concerning the criteria for qualification as a recommended value can be found in the report (IAEA/AL/046; IAEA/MEL/46) "Report on the Intercomparison Run IAEA-367: Radionuclides in Pacific Ocean Sediment" [1]. This report is available free of charge upon request.

Intended Use

This sample is intended to be used as a reference material for the measurement of radionuclides in marine sediments. It can also be used as a quality control material for the assessment of a laboratory's analytical work, for the validation of analytical methods and for quality assurance within a laboratory.

Origin and preparation of the material

The sediments sample was obtained from the Lawrence Livermore National Laboratory (USA) and was collected at the Enewetak Atoll in the Marshall Islands (Central Pacific Ocean), a former US nuclear weapons testing site.

The sediment which was mainly composed of a mixture of carbonate species, was dried, ground in a ball mill to pass a 500 µm sieve and then homogenised. The material was dispensed in 40 g units.

Homogeneity

The homogeneity of the bottled material was assessed using four marker radionuclides (^{60}Co , ^{137}Cs , $^{239+240}\text{Pu}$ and ^{241}Am) in several bottles selected at random. The homogeneity was determined using one-way analysis of variance and it was concluded that the material satisfied the homogeneity criteria for the radionuclides concerned.

Dry weight determination

All recommended values are expressed on a dry weight basis. Therefore the dry weight must be determined at the time of analysis, using separate sub-samples of at least 500 mg dried to constant weight in a drying oven set to 105 °C. Subsequent weighings should differ by less than 5 mg.

Instructions for use

The recommended minimum intake mass for analysis of radionuclides is 50 and 10 g for gamma and alpha,beta-emitters respectively.

Analysts are reminded to take appropriate precautions in order to avoid contamination of the material during handling. No special precautions are required for the storage of this material.

Legal disclaimer

The IAEA makes no warranties, expressed or implied, with respect to the data contained in this reference sheet and shall not be liable for any damage that may result from the use of such data.

References

- [1] Ballestra S., Lopez J. J., Gastaud J., Vas D., and Noshkin V., Report on the Intercomparison Run IAEA-367: Radionuclides in Pacific Ocean Sediment IAEA/AL/046 (IAEA/MEL/46), IAEA, Monaco 1991.

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